DECLASSIFIED
Authority NND735022

File - Test Section, Inf. Bd

REPORT

of

The Infantry Board

No. 1559

MODIFIED M-1 RIFLE (CARBINE)

FORT BENNING, GEORGIA

20 January 1944

24725—Benning, Ga., 9-16-42—2,000

DECLASSIFIED
Authority NND735022

Part of Section
file on
R/T 1559

SECRET

IB-474.2 (23 Feb 45) 3d Wrapper Ind.

THE INFANTRY BOARD, Fort Benning, Georgia, 17 March 1945.

TO: The Commanding General, Army Ground Forces, Army War College, Washington 25, D. C. (Through The Commandant, The Infantry School.)

1. References.

a. Report of The Infantry Board No. 1559, subject: Modified M-1 Rifle (Carbine), 20 January 44, extract

Par. 2 "The modifications of the M-1 Rifle consisted of shortening the barrel, operating rod, follower rod and operating rod spring, eliminating the hand guard and removal of a portion of the stock at the butt.

Par. 3 "The results of the tests conducted of the modified weapon indicate that:

a. It is 1.22 (1.21) pounds lighter than the M-1 rifle." Other details from Test No. 1 are:

Dimensions	M1 Rifle	Carbine	M1 Modified
Overall length	43.58"	35-11/16"	35-7/16" *
Barrel length	24"	(18")	16-15/16"
Butt stock (trigger to butt plate)	13-1/8"		12"
Weight w/o sling	9.5 lbs.	5 lbs.	8.29 lbs.

* 36-9/16" when equipped w/standard butt stock, see par. 2 of this Indorsement referring to par. 4e of USAFFE Report.

b. The modifications do not adversely affect the functioning of the weapon.

c. The modifications do not materially affect the accuracy of the weapon at ranges up to 500 yards.

d. The recoil, muzzle blast and muzzle flash are excessive.

e. The maximum range for launching grenades is slightly greater than the M1 Rifle.

f. The modified weapon is suitable for bayonet fighting.

g. It is understood that the British forces in India are considering a cut-down model of the standard "British Caliber .303 Rifle."

DECLASSIFIED
Authority NND735022

Since the writing of TIB Report No. 1559, 20 Jan 44, the British rifle was produced and a model was submitted by Col. Alan Whiteside, BAS, to The Infantry Board for information. Extract from General Staff Policy Statement Infantry Weapons - The Rifle (Secretary of State for War and Chief of the Imperial General Staff 57/S.A/2395 British).

Lightened Rifle

"A considerably lightened rifle (weight 7 lbs.) known as the M5 rifle, fitted with No. 5 (blade) bayonet (weight 8 ozs) has been introduced into the service. This rifle is a standard No. 4 rifle .303"* which has been lightened by reducing the length of the barrel and removing part of the furniture. It is two pounds lighter than the standard rifle and, notwithstanding the shortening of the barrel, its accuracy up to ranges of 500 yards is equal to that of the No. 4 rifle. It can be used to fire grenades. The whole of the United Kingdom rifle production has now turned over to the manufacture of this lightened rifle and bayonet which will gradually replace the M4 rifle. Initially, issuances are to be restricted to the Far Eastern theatre and to airborne forces."

*The American Rifle (Whelen) page 122 extract:

"** the .303 British cartridge, a cartridge very similar to our .30-40 in shape, and ballistics". The .30-40 cartridge is adapted to the US magazine rifle, Model 1898 (Krag) and some sporting rifles.

Extract from Armaments Design Department (Secret - British).

Rifle No. 5, Mk 1 (a comparison with Rifle No. 4)

"This rifle has been developed from existing equipment to provide a rifle as light as possible for Jungle Warfare without material loss of accuracy. Essentially it is a lightened No. 4 Rifle. It is fitted with a flash eliminator and a short sword type bayonet.

General Data	Rifle No. 5	Rifle No. 4
Barrel length	18.70"	25.22"
Overall length of rifle	39.50"	44.50"
Overall length of rifle and bayonet	47.50"	53.0"
Weight of rifle	7 lbs.	9 lbs., 1-1/4 ozs.
Weight of rifle and bayonet	7 lbs., 10 ozs.	9 lbs., 9-1/4 ozs.
(Sight	peep	peep)
(Flash eliminator	Yes	None)

Accuracy 4 out of 5 shots in rectangle 1" x 1-1/2" at 100 feet."

DECLASSIFIED
Authority NND735022

Lightened No. 1 Rifle (now known as No. 6 Rifle)

"In view of the fact that both Australia and India still make the No. 1 Rifle, a design of lightened pattern has been prepared. The following are the particulars:-

General Data	Lightened No. 1 Rifle	No. 1 Rifle
Barrel length	18"	25.5"
Overall length of rifle	40"	44.25"
Overall length of rifle and bayonet	48"	61.25"
Weight of rifle	7 lbs.	9 lbs.
Weight of Rifle and bayonet	7 lbs., 10 ozs.	10 lbs., 4 ozs.
Range scale	200 - 800 yds.	200 - 2000 yds.
Weight of bullet	174 grains	174 grains
Muzzle velocity	2340 f/s	2440 f/s
Total number of parts	73	101
Total saving in weight of rifle	2 lbs.	
Total saving in weight of rifle and bayonet	2 lbs., 10 ozs.	
(Sight	peep	open)
(Flash eliminator	Yes	None)

Accuracy
As for No. 5 Rifle - 4 out of 5 shots in rectangle 1" x 1-1/2" at 100 ft."

Par. 4. "It is the opinion of The Infantry Board that while the subject modified rifle is not a suitable Infantry weapon (considered unsuitable as a weapon for general use by the Infantry — (par. 5a of report) it has sufficient desirable features to merit consideration as being suitable for use under conditions when the full power of caliber .30 ammunition is desired (approximately the performance of the standard weapon) but limited stowage space indicates a requirement for a shorter weapon."

Stowage is used in the sense of stowage either in a vehicle or on the person.

Par. 5. "Recommendations:

a. "That the subject modified rifle be considered unsuitable as a weapon for general use by the Infantry.

b. "That the subject modified rifle be given consideration as a 'special purpose' weapon for types of troops or arms having a need for

DECLASSIFIED
Authority NND735022

a full-power weapon (approximately the performance of the standard weapon) requiring less stowage space than the standard M1 Rifle.

c. * * * *

b. TIB Report No. 1559 apparently covers the modified rifle referred to in letter Hq., 93d Division, 17 Aug 43, subject: Request for Test of Carbine, extract: "There is being submitted separately a carbine which it is requested be given a field test for possible acceptance as a carbine. This carbine was designed, made up, and initially tested by 1st Lt. Harold G. Burkett of the 793d Ordnance Company, with a view to materially decreasing the ammunition supply problem and affording a more efficient and versatile light shoulder weapon of greater striking power. This weapon was made up, almost entirely, of salvaged parts by cutting down an M-1 Rifle with a bulged muzzle.

The length of this weapon is 35-1/2 inches, and the weight is approximately 6-3/4 lbs. * * * *" The length corresponds approximately to that of the rifle tested by TIB. However, the weight of the tested rifle was 8.29 lbs.

1st Wrapper Indorsement, GNRQT-11/15396, 23 Feb 45, par. 2 states: "The subject weapon from the description contained in report No. 170 is identical with a shortened M1 Rifle previously tested and reported on by the Infantry Board."

2. Comments pertaining to USAFPE Board Report No. 192 (including conclusions):

Pars. 2b, 3a. "The firing referred to was conducted at a range of 100 yards. Tests at longer ranges were impossible because of the tactical situation." Accuracy tests conducted at 100, 300 and 500 yards by The Infantry Board indicated the following:

Range (yds)	Carbine (in.) Vert.	Horiz.	Max.	M1 Rifle (in.) Vert.	Horiz.	Max.	M1 Mod. (in.) Vert.	Horiz.	Max.
100	10.8	9.8	13.3	7.0	8.6	9.9	9.7	9.2	11.6
300	18.8	21.2	24.1	22.8	21.8	28.0	27.2	23.0	32.5
500	33.4	33.7	42.6	42.2	35.9	49.8	37.2 w/standard stock	26.0	40.7

DECLASSIFIED
Authority NND735022

The results of the above tests indicate (par. 3c, TIB Report): "The modifications do not materially affect the accuracy of the weapon at ranges up to 500 yards."

Par. 3b: Functioning -- functioning tests conducted by The Infantry Board indicate: "The modifications do not adversely affect the functioning of the weapon" (par. 3b, TIB Report).

Par. 4b (under "Conclusions Reached"): Weapons of different classes and purposes are being compared as the carbine approximately a 5 lb. weapon and the modified M1 Rifle, a 8.29 lb. weapon. Naturally the carbine cartridge does not have the power of the high power military rifle cartridge. Ease of carrying and firing are factors commensurate with the requirements and purposes for the carbine, standard rifle and modified rifle. If the factors of shock power, carrying and firing are best met by a type of weapon similar to the modified rifle this indicates a requirement of appropriate priority for such a weapon and the compilation of military characteristics for consideration by interested arms and services.

TIB Report No. 1559, above, indicates utility of and consideration to be given to the modified rifle by types of troops or arms having a need for a full-power weapon (approximately the performance of the standard M1 Rifle) requiring less stowage space than the standard M1 Rifle.

Comparisons of the U. S. Carbine, Caliber .30, M1 and its later developments with weapons not in the same category naturally should be made with caution. "The U. S. Carbine, Caliber .30, M1 is accepted as a highly successful weapon for the initial purpose for which it was designed (a replacement for the pistol or revolver for certain personnel). The potentialities of this weapon has led it to fields beyond the purpose of its original mission. It has been put to uses that were never intended for this weapon such as grenade launching and bayonet combat. It has met these requirements successfully. It has been subjected to a device to cause selective single shot and automatic fire. *****" (TIB Report 1644-B, 26 Aug 44). The M1 "Carbine" is a balanced weapon ballistically, however, a shortened barrel may be considered likewise for this commonly called "carbine" then in reality presenting its true carbine version.

The 7th Indorsement, AG 474 (6-15-40)M-C WD 27 Aug 40 to Chief of Ordnance, subject: Development of a light-weight rifle describes characteristics as follows:

"Weight not to exceed five pounds including sling.
"Range effective up to 300 yards.
"To be carried by a sling or some comparable carrying device."

DECLASSIFIED
Authority NND735022

Reference to this comparison is made in the booklet: Rifles and Machine Guns of the World's Armies, (The Infantry Journal -- Johnson), extract:

"The carbine *** is unfortunately being compared with high power rifles, which of course puts the carbine at an ultimate disadvantage when it becomes generally realized that you cannot substitute a pistol-type weapon even if it is fired from the shoulder for a flat shooting high velocity rifle type weapon.

"The carbine was developed to replace the pistol. The carbine was designed to be issued to personnel not normally carrying the standard rifle. Designed to be fired from the shoulder in the manner of a rifle, the carbine increases the efficiency of personnel so armed because it is easiest to control, is much more effective as a shoulder-fired weapon, and has a cartridge with considerably more accurate range than the .45. The carbine was not designed to replace the high-power rifle, and it cannot be compared with such weapons. The term "carbine" was originally used to signify a standard high (or other) power rifle with a short barrel and modified forestock. Carbines (military) were used in the United States as late as the model 1898 Krag. The Krag carbine had a 22-inch instead of a 30-inch barrel (standard Krag rifle) and a shortened wooden forestock."

Par. 4c. "The slight disadvantage of increased muzzle blast and flash due to the shortened barrel is negligible. The standard M1 rifle has sufficient blast and flash to disclose positions at most practical ranges used in the type of warfare in this theater."

If the muzzle blast and flash due to the shortened barrel are considered negligible for the purposes intended then these normally undesirable features appear to be discounted. Comparative flash photos of the M1 modified rifle and the M1 rifle (both w/o flash hiders) are shown in Plates 7 and 8, TIB Report No. 1559. The conical flash hider for the M1 rifle recommended in TIB Report No. 1675, Part A1, is a very effective device for reducing flash to a relatively adequate practicable minimum. The subject of flash reduction is a major Infantry Board project and it is an item of importance. An extract from The Ordnance Digest, March 1945, states: "The M2 flash hider was developed as a result of numerous reports from combat theaters indicating the need for the elimination of flash during night firing." The M2 flash hider and the carbine flash hider are removable devices. If the rifle barrel were reduced in length for certain purposes it appears that provision should be made for flash control, as well as for bayonet attachment and the launching of grenades including pyrotechnics. Referring to the British lightened rifle (par. 1 g above) provision is made for a flash hider.

DECLASSIFIED
Authority NND735022

Par. 4d: Weapons with barrels shorter than the standard rifle length but shooting the same ammunition as the standard are normal associated items for study. Should a shortened high power rifle be designated as a requirement and military characteristics established the results of research by the Ordnance Department would be indicated. The problem of whether the M1 rifle system of actuation or a short gas-strike system should be employed for a short high power rifle commensurate with performance and procurement capabilities is a problem requiring the benefits of Ordnance Department researches.

The short gas-stroke of a type originally developed for the carbine is said to be used in the German 7.92mm Automatic Rifle FG 42 (barrel length 19") designed for paratroop use.

The specific modified M1 rifle tested by The Infantry Board indicated: "The modification does not adversely affect the functioning of the weapon" (TIB Report No. 1559, par. 3 b).

Par. 4e: Modification of the butt of standard stock as incorporated in the modified M1 Rifle does not seem desirable as mentioned in par. 4e, USAFFE report. This is mentioned in the TIB Report, Record of Test, par. 4b(1) extract: "It will be noted that the M1 Mod. was introduced into the above test. This was done after it was found that the short stock on the M1 Mod. was causing discomfort and injury to the test personnel. It was believed that the difference in the length of the butt-stocks might make itself evident in the results of firing."

The following statement in the USAFFE report is of interest: "The recoil of the modified weapon was found to be less than that of the standard rifle ***" as it is at variance with the recoil of the specific modified rifle pendulum tested by The Infantry Board.

Par. 4f: The specific type of leaf sight referred to is not mentioned hence comment is reserved on account of insufficient information submitted as to exact type of sight which is under consideration.

Par. 4g: For comparison of modified M1 Rifle and Carbine, see par. 2, above. War Department Observers Board Report, 2 Jan 1945, subject: AGF Report No. 502 - Automatic Carbine, submitted by Colonel Albert G. Wing, Infantry Observer quotes battle uses of the carbine and under par. "C" the following extract appears: "If I may offer my personal view on this matter, it is to the effect that the modification of the carbine to automatic, including probably the compensator, is desirable for all T/E carbines, both as a means of increasing the value of the carbine as a defensive weapon, and

DECLASSIFIED
Authority NND735022

also, under conditions similar to those described above, for emergency use as an offensive weapon. However, from a common sense view, it appears obvious that the carbine is too light and fragile to serve as a primary infantry offensive weapon."

Par. 4 h. Regarding the question of bayonet fighting par. 2f, TIB Report No. 1559 states: "The modified weapon (Modified M1 Rifle) is suitable for bayonet fighting."

3. a. Paragraph 3, TIB Report No. 1559 presents the opinion of The Infantry Board as follows: "That while the subject modified rifle is not a suitable Infantry weapon (for general issue) it has sufficient desirable features to merit consideration as being suitable for use under conditions when the full power of caliber .30 ammunition is desired, but limited stowage space indicates a requirement for a shorter weapon."

b. If the requirement is established appropriate priority and the compilation of military characteristics are indicated for consideration by the interested arms and services.

c. The Infantry Board would appreciate any information concerning recent researches of short type M1 Rifle by the Ordnance Department.

For the President:

P. E. LEIBER,
Colonel, Infantry,
Acting Director.

2 Incls. n/c

DECLASSIFIED
Authority NND735022

474 (6 Feb 1944)
GNRQT-11/69423

6 Feb 1944

SUBJECT: Modified M-1 Rifle (Carbine).

TO: Commanding General, Army Service Forces, Attention: Director, Requirements Division, Development Branch.

1. Herewith Infantry Board Report No. 1559 covering test of Modified M-1 Rifle (Carbine). Subject rifle was received by the Infantry Board from the Commanding General, 93d Infantry Division, with a request that it be tested for possible acceptance as a carbine.

2. Due to numerous malfunctions and the uncomfortable stock length of the original rifle, the Board replaced the stock with a standard type and also made various new parts. After this was accomplished, the weapon functioned very well. The reduction in length amounted to 7 1/16 inches and in weight to approximately 1.20 lbs., but the recoil, muzzle blast and muzzle flash were increased considerably.

3. In view of the above and other pertinent facts presented in the report, the modified M-1 Rifle is not considered to possess sufficient desirable characteristics to warrant its adoption for use by Army Ground Forces. It is understood that a similar development is being undertaken by the Ordnance Department and as this report contains considerable information relative to the subject, it is requested that it be brought to the attention of personnel engaged with the project.

For the COMMANDING GENERAL:

(Stamped) GEORGE SELENO
Major, A.G.D.
Asst. Ground Adj. Gen.

1 Incl.
IB Rpt (in dup)
#1559, dtd 20 Jan 44

COPY

DECLASSIFIED
Authority NND735022

IB-474.2

20 JAN 1944

Subject: Modified M-1 Rifle (Carbine).

To: Chief of Ground Requirements Section,
Army Ground Forces, Army War College,
Washington, D. C.

1. Attention is invited to the inclosed memorandum report which covers in detail tests of the subject weapon. This project was initiated by The Infantry Board at the request of the Commanding General, 93rd Infantry Division.

2. The modifications of the M-1 Rifle consisted of shortening the barrel, operating rod, follower rod and operating rod spring, eliminating the hand guard and removal of a portion of the stock at the butt.

3. The results of the tests conducted of the modified weapon indicate that:

a. It is 1.22 pounds lighter than the M-1 Rifle.

b. The modifications do not adversely affect the functioning of the weapon.

c. The modifications do not materially affect the accuracy of the weapon at ranges up to 500 yards.

d. The recoil, muzzle blast and muzzle flash are excessive.

e. The maximum range for launching grenades is slightly greater than that of the M-1 Rifle.

f. The modified weapon is suitable for bayonet fighting.

g. It is understood that British forces in India are considering a cut-down model of the standard British Caliber 303 Rifle.

4. It is the opinion of The Infantry Board that while the subject modified rifle is not a suitable Infantry weapon it has sufficient desirable features to merit consideration as being suitable for use under conditions when the full power of Caliber .30 ammunition is desired, but limited stowage space indicates a requirement for a shorter weapon.

DECLASSIFIED
Authority NND735022

5. The Infantry Board recommends:

a. That the subject modified rifle be considered unsuitable as a weapon for general use by the Infantry.

b. That the subject modified rifle be given consideration as a "special purpose" weapon for types of troops or arms having a need for a full-power weapon requiring less stowage space than the standard M1 Rifle.

c. That 1st Lieutenant Harold G. Burkett, 793rd Ordnance Company, be commended for his interest and ingenuity in designing the weapon.

6. Pending receipt of instructions regarding its disposition, the subject weapon will be retained by The Infantry Board.

7. The Commanding General, 93rd Infantry Division, has been advised of the forwarding of this report, but not of the Infantry Board's findings or conclusions.

For the President:

INGOMAR M. OSETH,
Colonel, Infantry,
Director.

1 Incl.
Memo. Report.

DECLASSIFIED
Authority NND735022

TEST SECTION

10 January 1944.

MEMORANDUM TO: The Director,
The Infantry Board,
Fort Benning, Ga.

SUBJECT: Modified M1 Rifle (Carbine).

1. Reference letter, Headquarters 93rd Infantry Division, 17 August 1943, (AG 400.111 (8-9-43)), with one inclosure and one indorsement.

2. The subject rifle, which will hereinafter be referred to as the "M1 Mod.", was received 26 August 1943. Tests were conducted in compliance with the 1st indorsement of reference letter. Results of tests follow.

3. Physical Characteristics.

a. Dimensions and weights.

Dimensions	M1 Rifle	Carbine	M1 Mod.
Overall length	43 5/8"	35 11/16"	35 7/16"
Barrel length	24"		16 15/16"
Buttstock (Trigger to buttplate)	13 1/8"		12"
Weight (Without slings)	9.5 lbs.	5 lbs.	8.29 lbs.

b. Alterations in M1 Rifle parts required to make M1 Mod. See Incl. No. 1, Plate 1.

(1) Barrel shortened 7 1/16 inches. See Incl. No. 1, Plate 2.

(2) Front hand guard eliminated. See Incl. No. 1, Plate 3.

(3) Operating rod shortened 7 1/16 inches. See Incl. No. 1, Plate 4.

(4) Follower rod shortened 15/16 inches. See Incl. No. 1, Plate 4.

(5) Operating rod spring shortened 5 inches. See Incl. No. 1, Plate 4.

DECLASSIFIED
Authority NND735022

4. Accuracy, as compared to the M1 Rifle and the Carbine.

a. Firing tests with the M1 Mod. were attempted with the weapon as received. During the first 72 rounds fired there were 42 malfunctions. The malfunctions varied from failures to feed, lock, fire, eject, the failure of the follower rod to be retained by the follower rod pin. The operating rod also slipped out of the gas cylinder. Firing tests were suspended until the weapon was rebuilt. Rebuilding consisted of replacement of altered parts with parts that had been carefully machined. In addition the barrel was replaced, and a new gas cylinder provided and fitted the same as on the M1 Rifle.

b. Accuracy tests were resumed with the rebuilt weapon. Six men fired the M1 Mod., the M1 Rifle and the Carbine at 100 and 300 yards, and the M1 Mod., and the M1 Rifle at 500 yards with the following results:

	Carbine			M1 Rifle			M1 Mod.		
Range	Vert.	Horz.	Max.	Vert.	Horz.	Max.	Vert.	Horz.	Max.
100 yards	10.8	9.8	13.3	7.0	8.6	9.9	9.7	9.2	11.6
300 yards	18.8	21.2	24.1	22.8	21.8	28.0	27.2	23.0	32.5
	M1 Mod. w/std. stock								
500 yards	33.4	33.7	42.6	42.2	35.9	49.8	37.2	26.0	40.7

(1) It will be noted that the M1 Mod. with standard stock was introduced into the above test. This was done after it was found that the short stock on the M1 Mod. was causing discomfort and injury to the test personnel. It was believed that the difference in the length of the buttstocks might make itself evident in the results of firing.

(2) Results of firing were somewhat paradoxial in that the M1 Mod. produced groups smaller than those of the Carbine and larger than those of the M1 Rifle at 100 yards while at 300 yards the groups from the M1 Mod. were larger than those of either the M1 Rifle or the Carbine. At 500 yards the groups produced by the M1 Mod. were smaller than those of the M1 Rifle.

5. Recoil, as compared to the M1 Rifle and the Carbine. The recoil of the M1 Mod. is greater than that of either the M1 Rifle or

DECLASSIFIED
Authority NND735022

the Carbine. Comparison is tabulated below:

M1 Mod.	12.5 foot pounds
M1 Rifle	11.5 foot pounds
Carbine	4.0 foot pounds

6. Functioning in dust and water.

a. Comparative tests were conducted on the M1 Mod., the M1 Rifle and the Carbine for functioning in dust and water. Eighty rounds were fired with each in the dust test. Forty rounds were fired with each in the water test.

b. In the dust test the functioning of the M1 Mod. was comparable to the functioning of the M1 Rifle. Both were superior to the Carbine.

c. In the water test the functioning of the M1 Mod. was comparable to the functioning of the M1 Rifle and the Carbine except that immediate action could not be applied to the M1 Mod. by hand when stoppages occurred. It was necessary to use a hammer to unlock and to close the bolt.

7. Maximum range for launching the M11A2 Grenade with the M7 Launcher and the M3 Cartridge.

a. As received, the M1 Mod. would not accommodate the M7 launcher. However, when the weapon was rebuilt prior to firing the accuracy tests the new barrel was made to fit the launcher.

b. At maximum (45°) elevation an average range of 315 yards was obtained with the M1 Mod. This is 15 yards greater than the average range obtained with the M1 Rifle.

8. Muzzle blast in comparison to the M1 Rifle and the Carbine.

a. Tests to determine the magnitude of the muzzle blast of the M1 Mod., the M1 Rifle and the Carbine were conducted with the muzzle of the weapon being tested placed in a box having a series of holes varying 3/8 inch diameter to 1 inch diameter bored in the sides and covered with paper. When the weapon is fired the paper over some of the holes is broken. The magnitude of the blast is inversely proportioned to the square of the diameter of the smallest diaphragm of paper broken. (See Incl. No. 1, Plates 5 and 6.)

->-

DECLASSIFIED
Authority NND735022

b. The paper over the 1/2 inch diameter hole was broken when the M1 Mod. was fired, and the paper over the 5/8 inch diameter hole was broken when the M1 Rifle was fired, indicating that the muzzle blast of the M1 Mod. is 1 1/2 times as great as the muzzle blast of the M1 Rifle. The muzzle blast of the Carbine failed to break the paper over any of the holes. While a definite comparison between the M1 Mod. and the Carbine could not be made in this test, the test indicates that the muzzle blast of the M1 Mod. is at least 4 times as great as the muzzle blast of the Carbine since the paper over the largest hole was not broken by the blast of the Carbine.

c. The muzzle flash was tested by the taking of photographs of the flash at night. The flash of the M1 Mod. is approximately twice the diameter of the flash of the M1 Rifle and many times as bright. The flash of the Carbine was not sufficient to register on the photographs. (For photographs see Inclosure No. 1, Plates 7 and 8.

9. Suitability for bayonet fighting. Tests indicate that the balance of the M1 Mod. with the bayonet is satisfactory for bayonet fighting. However, the length of the weapon is 7 inches shorter than the M1 rifle. The ultimate effectiveness of the weapon with the bayonet will depend on the skill of the user and the length of the opposing weapon.

10. Discussion. a. Study of the physical characteristics of the M1 Mod. show that extensive alterations were required to obtain a shortening of the weapon amounting to 7 inches and a reduction of weight of 1.71 pounds. These alterations have not materially affected the accuracy of the weapon within the range tested, namely 500 yards, nor have they materially affected the functioning of the weapon. Due to the increased muzzle pressure incurred by the shorter barrel, the launching range for grenades has been slightly increased. The increased muzzle pressure has also increased the muzzle blast materially and the shorter barrel has resulted in an increased amount of powder burning beyond the muzzle with a corresponding greater muzzle flash. The suitability for bayonet fighting has not been materially affected. The recoil has been increased.

b. Since the M1 Mod. does not approach the Carbine in weight, has a greater muzzle blast and flash than either the Carbine or the M1 Rifle, and a greater recoil than either, it does not seem that the results obtained by the alterations warrant their inclusion

DECLASSIFIED
Authority NND735022

in the design of a cartdne based on the design of the U.S. Rifle, Cal. .30, M1.

1 Incl.
Plates 1 to 8.

WILLIAM J. WADE,
Major, Infantry,
Test Officer.

WILLIAM L. LINDSEY,
Captain, Infantry,
Test Officer.

I concur in this report:

WILLIAM C. RUTHERFORD,
Lt. Colonel, Infantry,
Chief of Test Section.

DECLASSIFIED
Authority NND735022

Comparison of M1, M1 Modified Rifles and Carbine.

	Weapon	Weight without sling	Length
a.	M1 Rifle	9.5 lbs.	43-5/8"
b.	M1 Modified Rifle	8.29 lbs.	35-7/16"
c.	Carbine	5 lbs.	35-11/16"

Length of buttstock from trigger to buttplate.

M1 .....13-1/8"

M1 Modified .....12"

DECLASSIFIED
Authority NND735022

Barrel of M1 Rifle shortened 7-1/16" to make M1 Modified.

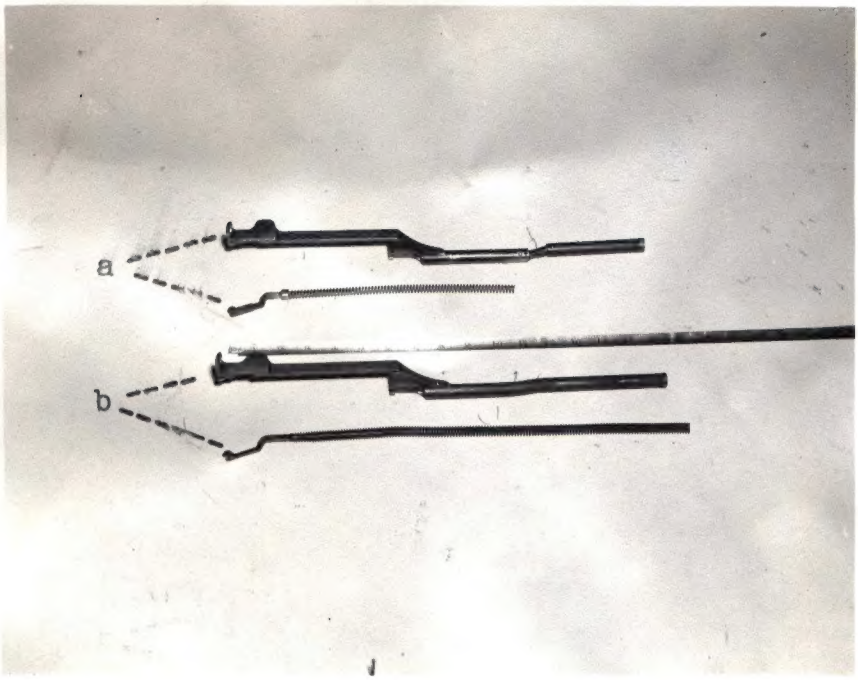
a - M1 Rifle
b - M1 Modified.

DECLASSIFIED
Authority NND735022

Handguard eliminated from M1 Rifle
to make M1 Modified.

a - M1 Rifle
b - M1 Modified

DECLASSIFIED
Authority NND735022



Modification of operating rod, follower rod, and operating rod spring of M1 Rifle to make M1 Modified.

a - M1 Modified Rifle parts as received from 93rd Infantry Division.

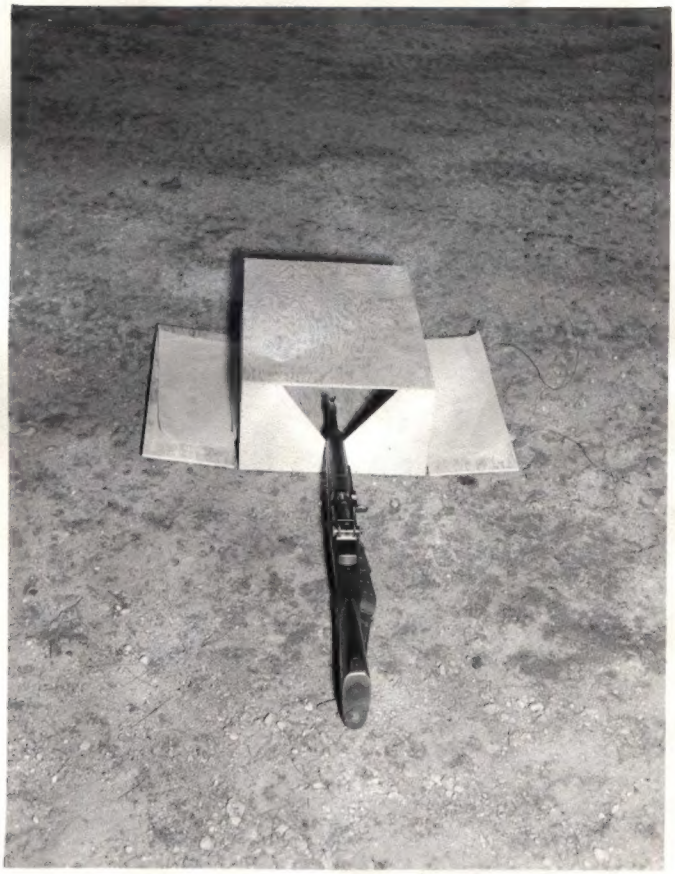
b - Infantry Board's modification of subject rifle.

(1) Operating rod 7-1/16" shorter than M1 operating rod.

(2) Follower rod 15/16" shorter than the M1 follower rod.

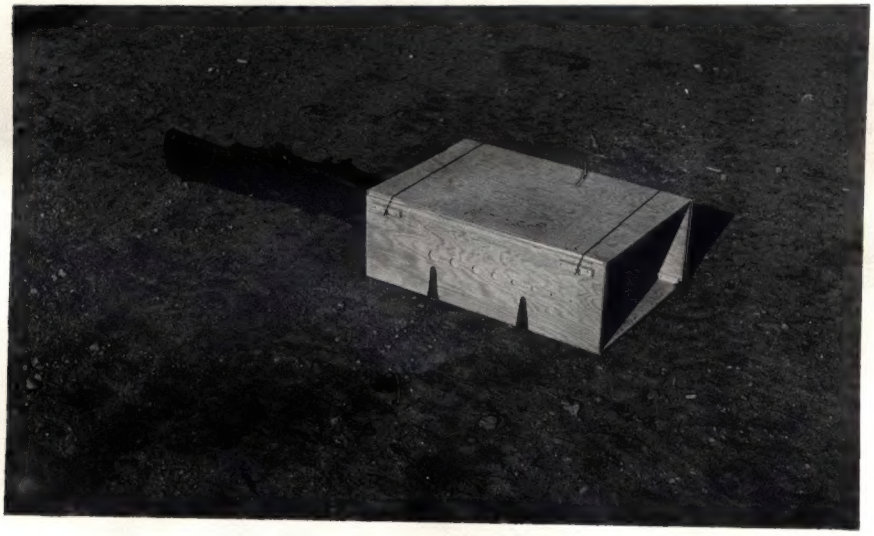
(3) Operating rod spring 5" shorter than the M1 operating rod spring.

DECLASSIFIED
Authority NND735022



Method of testing muzzle blast

DECLASSIFIED
Authority NND735022



Method of testing muzzle blast

Note holes with paper diaphragms.

Encl. No. 1 Plate No. 6